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| EXAMINER | |
|---|---|
| AUGHENBAUGH, WALTER | |
| **ART UNIT** | **PAPER NUMBER** |
| 1772 | |

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15

Please find below and/or attached an Office communication concerning this application or proceeding.

C4015

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/762,677 | COURT ET AL. | |
| | Examiner | Art Unit | |
| | Walter B Aughenbaugh | 1772 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *13 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☒ Claim(s) *2,10 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 13, 2003 has been entered.

### *Acknowledgement of Applicant's Amendments*

2. The amendments made in the abstract on page 10 of the Amendment filed August 13, 2003 (Paper 14) have been received and considered by Examiner.

3. The amendments made in claims 1-6, 8, 10 and 20 in the Amendment filed August 13, 2003 (Paper 14) have been received and considered by Examiner.

### *WITHDRAWN OBJECTIONS*

4. The objection to the abstract made of record in paragraph 17 of Paper 10 has been withdrawn due to Applicant's amendments to the abstract in Paper 14.

### *WITHDRAWN REJECTIONS*

5. The 35 U.S.C. 112 rejection of claims 10 and 20 repeated in paragraphs 9 and 10, respectively, of Paper 10, has been withdrawn due to Applicant's amendments in Paper 14. Applicant states that claim 10 was amended "to clarify Markush language", but Markush language is not recited in claim 10. MPEP 2173.05(h) states "One acceptable form of alternative expression, which is commonly referred to as a Markush group, recites members as being "selected from the group consisting of A, B and C.""

6. The 35 U.S.C. 112 rejection of claims 2-7 and 10 made of record in paragraph 18 of Paper 10 has been withdrawn due to Applicant's arguments on page 7 of Paper 14.

7. All 35 U.S.C. 103 rejections previously made of record have been withdrawn due to Examiner's reconsideration of the teachings of the Witschard patent. The MBS polymer discussed at col. 7, lines 3-55 is not a triblock copolymer because the polybutadiene-styrene trunk polymer rubber (col. 7, lines 19-20) is not a block copolymer, but a random copolymer, as evidenced by the attached page 545 of *Polymer Science Dictionary*.

## *NEW OBJECTIONS*

### *Specification*

8. The amendment filed August 13, 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the term "linear" added in the third line of claim 1; the specification does not disclose the structure recited by the phrase "linear ABC triblock copolymer".

Applicant is required to cancel the new matter in the reply to this Office Action.

9. The abstract of the disclosure is objected to because of the language used in the last three lines of the abstract. Insert --the-- immediately before "A", "fluororesin", "B", "fluororesin", "C" and "fluororesin" in the last three lines of the abstract. Also spell the word "with" correctly at the end of the second-to-last line of the abstract.

Correction is required. See MPEP § 608.01(b).

### *Claim Objections*

10. Claims 2, 10 and 18 are objected to because of the following informalities: a period appears in the third line of claim 2. There is a comma after the first species recited in claim 10 but a semicolon after the second species recited in claim 10; amend the claim so that the use of punctuation is consistent to avoid confusion in interpreting the claim. In further regard to claim 10, remove the comma immediately after the term "copolymers" in the sixth line of the claim: the claim reads as if the term "copolymers" is a separate species unto itself. In regard to claim 18, insert --copolymer-- between the terms "triblock" and "is".

Appropriate correction is required.

### *NEW REJECTIONS*

### *Claim Rejections - 35 USC § 112*

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The term "linear" added in the third line of claim 1 is not supported in the specification. The specification does not disclose the structure recited by the phrase "linear ABC triblock copolymer".

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1, 9, 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regard to claim 1, the structure intended to be recited by the term "linear" in the phrase "linear ABC triblock copolymer" cannot be ascertained. Furthermore, the term "semicrystalline" in claim 1 is a relative term which renders the claim indefinite. The term "semicrystalline" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. While Applicant's argued that the term "semicrystalline" is "an understood term of art" on page 7 of Paper 9, Examiner recognizes that the "semicrystalline" is a commonly used term by those of ordinary skill in the art, but it is a relative term that only has definite meaning when used in accordance with criteria that is delineated for a given composition.

Claim 9 recites the limitation "sequences" in the sixth, seventh and eighth lines of the claim. There is insufficient antecedent basis for this limitation in the claim. In further regard to claim 9, the claimed relative amounts of the A, B and C blocks that are "calculated with respect to the total weight of fluororesin with the block copolymer" indicate absolutely nothing about the amounts of the A, B and C blocks in the blend relative to the fluoropolymer because the particular "total weight of fluororesin with the block copolymer" used to arrive at the claimed amounts of "20 to 93", "5 to 68" and "2 to 65" "parts by weight" is not recited. "2 to 65 parts by weight" per how many parts by weight of the "total weight of fluororesin with the block copolymer", etc.?

In regard to claims 19 and 20, the use of slashes ("/") and addition signs ("+") renders the claim indefinite as to the structure intended to be recited. Write out the structure.

***Claim Rejections - 35 USC § 103***

15. Claims 1, 2, 8-11, 13, 15, 16, 18 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witschard in view of Rober et al.

Witschard teaches a polymer blend comprising a polyvinyl halide resin and a block copolymer (col. 3, lines 54-68). Vinyl fluorides, such as vinylidene fluoride, are listed among suitable vinyl halide homopolymers and copolymers (col. 4, lines 39-57). Witschard teaches that the block copolymer is a thermoplastic block elastomer wherein the major proportion of the monomer units are derived from both a mono-alkenyl-substituted aromatic compound of the benzene or naphthalene series, such as styrene, and a conjugated hydrocarbon alkadiene, such as butadiene (col. 7, line 58 – col. 8, line 31 and col. 8, lines 54-63). Witschard teaches that the block copolymer also includes, as a third comonomer in a minor proportion, vinyl pyridine, acrylonitrile, a lower alkyl ester of acrylic acid such as methyl methacrylate, methacrylonitrile or a vinyl carboxylate such as vinyl acetate (col. 8, lines 32-44 and col. 12, lines 32-34) and that the block copolymer is a linear triblock copolymer (col. 9, lines 18-22), where the third comonomer monomers necessarily constitute the third block of the triblock copolymer. Witschard teaches that methyl methacrylate is compatible with the fluoropolymer since methyl methacrylate can be used as a processing aid that is incorporated into the fluoropolymer (col. 12, lines 30-34), and therefore, the methyl methacrylate of Witschard corresponds to the A block (that is compatible with the fluororesin) as claimed. Witschard teach that a styrene-butadiene block copolymer is not compatible with the fluoropolymer (col. 15, lines 19-59, col. 16, lines 22-32, col. 17, lines 9-13

and Tables I and II) as indicated by the degree of transparency of blends of the styrene-butadiene block copolymer with the fluoropolymer, therefore, Witschard teach that the styrene and butadiene blocks are incompatible with the fluororesin and therefore, each of the styrene and butadiene blocks correspond to both the B and C blocks as claimed. Since styrene and butadiene are both nonpolar, and methyl methacrylate (A block) is polar, the B and C blocks are necessarily incompatible with the A block as claimed. The ABC triblock copolymer taught by Witschard by definition has three blocks A, B and C being linked together in this order, each block being either a homopolymer or copolymer obtained from two or more monomers, the A block being linked to the B block and the B block to the C block by means of a covalent bond or of an intermediate molecule linked to each adjacent block via a covalent bond as claimed.

Witschard fails to teach a tube with an inner layer comprising the blend. Rober et al., however, teach a multilayer pipe with good barrier action towards methanol-containing fuels having a layer containing a mixture of polyvinylidine fluoride and acrylate copolymer and a polyamide layer (col. 1, lines 45-66). The two layers are adhered to one another (col. 1, line 66). One of ordinary skill in the art would have recognized to use the vinylidene fluoride, acrylate-containing polymer blend of Witschard as the material of the inner layer of a tube and to adhere a polyamide layer to the inner polyvinylidene fluoride blend layer in order to impart good fuel barrier properties to the tube as taught by Rober et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the vinylidene fluoride, acrylate-containing polymer blend of Witschard as the material of the inner layer of a tube in order to impart good fuel barrier properties to the tube as taught by Rober et al.

In regard to claim 8, Witschard fails to teach that the inner layer contains a dispersed electrically conductive carbon black filler. Rober et al. teach additional layers with the same composition as the polyamide and/or fluoropolymer blend that are made electrically conductive with a surface resistance of less than $10^9\Omega$ by addition of conductivity black, carbon fibers, metal powders, or the like (col. 5, lines 1-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added carbon black to the inner layer of Witschard and Rober et al. in order to provide a surface resistance of less than $10^9\Omega$ as taught by Rober et al.

In regard to claim 9, Witschard teaches that the vinyl halide polymer is present in a 50-99 weight percent of the blend, and that the block polymer is present in a 1-50 percent of the blend (col. 3, lines 60-68). Witschard teaches that the weight ratio of mono-alkenyl-substituted aromatic compound to the conjugated hydrocarbon alkadiene is from about 1:1 to about 1:10 (col. 8, lines45-53), and that the third comonomer is present in a minor proportion relative to the other two comonomers (col. 8, line 36); these teachings of Witschard fall within the relative weight ranges claimed in the instant application. Witschard and Rober et al. fail to teach a molecular weight for the triblock copolymer. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared the copolymer to the greater than 20,000 g/mol limitation depending on the desired end result in terms of the degree of impact resistance of the blend (col. 3, lines 54-59), since it has been held that discovering an optimium value of a result effective variable involves only routine skill in the art in absence of unexpected results. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

In regard to claims 13 and 15, the polybutadiene block taught by Witschard is a polydiene, and the methyl methacrylate block taught by Witschard is an alkyl (alkyl) acrylate.

In regard to claim 21, Witschard teaches the use of vinyl halide polymers derived from polymerization of two, three or more different vinyl halide monomers (col. 4, lines 41-44). Witschard and Rober et al. fail to teach that the fluororesin is a copolymer of VF2 (vinylidene fluoride) and at least one of chlorotrifluoroethylene, hexafluoropropylene, trifluoroethylene or tetrafluoroethylene. Rober et al., however, teach that the polyvinylidene fluoride of the mixture of polyvinylidene fluoride and acrylate copolymer of Rober et al. can be a copolymer based on vinylidene fluoride which contains up to 40% by weight of other monomers such as trifluoroethylene (col. 3, lines 17-22). Therefore, one of ordinary skill in the art would have recognized to have included trifluoroethylene as a comonomer in the vinyl halide polymer of Witschard et al. since it is notoriously well known to one of ordinary skill in the art to use a copolymer of polyvinylidene fluoride and trifluoroethylene as the material of the inner layer of a fuel tube as taught by Rober et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included trifluoroethylene as a comonomer in the vinyl halide polymer of Witschard et al. since it is notoriously well known to one of ordinary skill in the art to use a copolymer of polyvinylidene fluoride and trifluoroethylene as the material of the inner layer of a fuel tube as taught by Rober et al.

In regard to claim 22, Witschard et al. teach that the polydiene "B block" is polybutadiene (col. 8, lines 20-31). Note that the recitation "optionally partially or completely hydrogenated" is not a positive limitation, due to the recitation of "optionally".

In regard to claim 23, Witschard et al. teach that the alkyl (alkyl) acrylate "A block" is a homopolymer or copolymer of methyl methacrylate (col. 8, lines 32-43 and col. 12, lines 32-34).

16. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witschard in view of Rober et al. and in further view of Lorek.

Witschard and Rober et al. teach the tube as discussed above.

In regard to claim 3, Witschard and Rober et al. fail to teach that a functional acrylic compound is added to the blend of the inner layer of the tube. Lorek, however, teaches an adhesion binder for polyvinlidene fluoride which comprises polymer A, which is, for example, a derivative of poly(methyl methacylate) (col. 2, lines 11-14) for a tube with an outer polyamide layer and an inner fluorinated polymer layer (col. 3, lines 20-24). The moieties in polymer A shown in col. 1 are functional acrylic compounds, as shown by the -(carbonyl carbon)-carbon-carbon- sequence in each moiety. Lorek further teaches that for fuel pipes, the binder based on polymer A is preferably mixed with fluorinated polymer in order to make it less rigid (col. 4, lines 30-34). Therefore, one of ordinary skill in the art would have recognized to include the binder based on polymer A in the fluoropolymer-copolymer blend inner layer of Witschard and Rober et al. in order to make the binder layer less rigid as taught by Lorek and to improve the adhesion between the polyamide and the fluoropolymer-copolymer blend layers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the binder based on polymer A in the fluoropolymer-copolymer blend inner layer of Witschard and Rober et al. in order to make the binder layer less rigid as taught by Lorek and to improve the adhesion between the polyamide and the fluoropolymer-copolymer blend layers.

In regard to claim 4, Witschard and Rober et al. fail to teach that the tube is a trilayer tube with an adhesion binder between the polyamide and the fluoropolymer-copolymer blend layers. Lorek, however, teaches a three layer tube with a layer of polyvinylidene fluoride, a layer of the binder as discussed above in the rejection of claim 3 and a layer of polymer which is incompatible with the fluorinated polymer (col. 2, lines 61-66) such as polyamide (col. 3, lines 20-24). Lorek teaches that fuel pipes manufactured according to the invention with an inner layer of fluorinated polymer bonded by the adhesion binder to an outer layer of polyamide have exceptional resistance to permeation of alcohols, alcohol-containing fuels and to heat (col. 4, lines 10-17 and 50-52). One of ordinary skill in the art would have therefore recognized to place a binder layer between the polyamide and the fluoropolymer-copolymer blend layers of Witschard and Rober et al. in order to provide a fuel pipe with exceptional resistance to alcohols, alcohol-containing fuels and to heat as taught by Lorek and to provide excellent adhesion between the polyamide and the fluoropolymer-copolymer blend layers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have placed a binder layer between the polyamide and the fluoropolymer-copolymer blend layers of Witschard and Rober et al. in order to provide a fuel pipe with exceptional resistance to alcohols, alcohol-containing fuels and to heat as taught by Lorek and to provide excellent adhesion between the polyamide and the fluoropolymer-copolymer blend layers.

In regard to claim 5, Witschard and Rober et al. fail to teach that a succession of intermediate layers are placed between the inner layer and the polyamide layers. Lorek, however, teaches a five-layer pipe formed from a central layer of fluorinated polymer with layers

of binder on both sides and layers of polyamide adjacent to both binder layers, in the order of "polyamide/binder/fluorinated polymer/binder/polyamide" (col. 4, lines 18-23). It would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the central fluorinated polymer layer with an outer polyamide layer in the 5-layer structure taught by Lorek, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

17. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witschard in view of Rober et al. and in further view of Bayard et al.

Examiner reminds the applicant that the method of forming the tube (and therefore the compositions of the components of the tube) is not germane to the issue of patentability of the tube (and therefore the compositions of the components of the tube) itself. Note that the recitation "optionally A homopolymer" is not a positive limitation, due to the recitation of "optionally".

Witschard and Rober et al. teach the tube as discussed above. Witschard and Rober et al. fail to teach that the ABC triblock copolymer contains BC diblock copolymer and C homopolymer (in the case of claim 6) or AB diblock copolymer and A homopolymer (in the case of claim 7). However, Bayard et al. teach an initiation system for the anionic polymerization of acrylic monomers and for the preparation of diblock and triblock acrylic copolymers (col. 1, lines 12-19). The triblock polymers may be of the ABC type and the blocks are chosen from acrylic, methacrylic and nonacrylic vinyl monomer blocks (col. 6, lines 6-10). Examples of nonacrylic vinyl monomers that may be joined with acrylic blocks are butadiene, isoprene and vinylaromatic monomers (such as styrene) (col. 4, lines 1-4). Bayard et al. note that no residual

homopolymer is observed in the example preparation of a methyl methacrylate-butyl acrylate diblock copolymer (col. 17, lines 36-41). Bayard et al. disclose that 20% methyl methacrylate homopolymer is generally obtained with other initiation systems (col. 17, lines 36-41). Thus, the possibility of a yield of homopolymer when preparing diblocks copolymers is clearly disclosed. One of ordinary skill in the art would further recognize that diblock copolymers are sometimes attained in preparation of triblock polymers. Bayard et al. disclose that a methyl methacrylate-butyl acrylate-methyl methacrylate triblock copolymer is obtained in an 80% yield (col. 19, lines 11-13). One of ordinary skill in the art would recognize that diblock copolymers and homopolymers make up the residual 20%. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the ABC triblock copolymer contains BC diblock copolymer and C homopolymer (in the case of claim 6) or AB diblock copolymer and A homopolymer (in the case of claim 7), depending on the polymerization conditions as taught by Bayard et al.

18. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witschard in view of Rober et al. and in further view of Tsutsumi et al.

Witschard and Rober et al. teach the tube as discussed above.

In regard to claim 12, Witschard and Rober et al. fail to teach that the B block has a glass transition temperature ranging from -100°C to -50°C. Tsutsumi et al., however, teach a butadiene-based rubber composition containing a butadiene-based homopolymer or copolymer having a glass transition temperature between -105°C and -70°C (claim 1). Tsutsumi et al. disclose that if the glass transition temperature is less than -105°C, processability is poor, while more than –70°C is also unfavorable since the wear resistance of the resulting rubber is lower.

Therefore, one of ordinary skill in the art would have recognized to polymerize the B block under appropriate conditions so as to obtain a B block with a glass transition temperature ranging from -100°C to -50°C in order to maintain good processability and mechanical properties of the B block as taught by Tsutsumi et al.

In regard to claim 14, Witschard and Rober et al. fail to teach that the C block has a glass transition temperature greater than that of the B block. Tsutsumi et al., however, teach the copolymerization of different amounts of styrene with different amounts of butadiene (col. 6, lines 38-54 and table 1a). Table 1a clearly shows that the glass transition temperature ($T_g$) of the copolymer increases with an increase in styrene content. For example, the $T_g$ of copolymer A with a 3% block polystyrene content and a 17% vinyl bond content is -92°C, while the $T_g$ of copolymer I with a 7% block polystyrene content and a 16% vinyl bond content is -60°C. One of ordinary skill in the art would have recognized that this increase in $T_g$ of the copolymer with an increase in styrene content indicates that styrene (the C block in the instant application) has a greater $T_g$ than butadiene (the B block in the instant application).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a C block with a $T_g$ that is greater than that of the diene B block in order to increase the $T_g$ of the copolymer so that it is greater than the $T_g$ of the diene alone so that the processability of the copolymer is improved.

19. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witschard in view of Rober et al. and in further view of Drzewinski.

Witschard and Rober et al. teach the tube as discussed above. Witschard and Rober et al. fail to teach that the poly(methyl methacrylate) (PMMA) is syndiotactic and its glass transition

temperature is from 120°C to 140°C. Drzewinski, however, teach that syndiotactic PMMA blended with polycarbonate assures compatibility and miscibility between the components throughout the whole range of compositions (col. 2, lines 47-51). Drzewinski further disclose that syndiotactic PMMA with a glass transition temperature of 132°C was blended with polycarbonate. One of ordinary skill in the art would have recognized to have used syndiotactic PMMA with a glass transition temperature from 120°C to 140°C in order to assure that the PMMA portion of the copolymer of Witschard and Rober et al. is miscible with the polymer it is blended with as taught by Drzewinski.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used syndiotactic PMMA with a glass transition temperature from 120°C to 140°C in order to assure that the PMMA portion of the copolymer of Witschard and Rober et al. is miscible with the polymer it is blended with as taught by Drzewinski.

20. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witschard in view of Rober et al. and in further view of Lorek.

Witschard and Rober et al. teach the tube as discussed above. Witschard and Rober et al. fail to teach a four layer tube with the following layers in the specified order: polyamide/binder/fluoropolymer/(fluoropolymer blended with copolymer and carbon black) in the case of claim 19 or polyamide/binder/fluoropolymer blended with copolymer/(fluoropolymer blended with copolymer and carbon black) in the case of claim 20. However, Lorek teaches a five-layer pipe formed from a central layer of fluorinated polymer with layers of binder on both sides and layers of polyamide adjacent to both binder layers, in the order of "polyamide/binder/fluorinated polymer/binder/polyamide" (col. 4, lines 18-23) as discussed

above. Since the binder is preferably mixed with fluorinated polymer in order to render the binder layers less rigid (col. 4, lines 30-34), the four-layer structure claimed by the applicant exists in this five layer structure along with a second polyamide layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have omitted one of the polyamide layers in the five-layer structure of Lorek, since it has been held that omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. *In re Karlson*, 136 USPQ 184. Omission of one of the polyamide layers does not affect the function of the tube since the three layer structure of Lorek of an inner layer of fluorinated polymer bonded by the adhesion binder layer to an outer layer of polyamide (col. 4, lines 10-15) exists in the four-layer structure. This three-layer structure decreases the permeability by a factor of 10 relative to that of an equivalent pipe made of only polyamide (col. 4, lines 12-15). Therefore, omission of a polyamide layer, which has inferior permeability resistance compared with the three-layer structure, from the five-layer structure does not affect the permeation properties of the resultant four-layer structure.

In regard to the carbon black limitation, as discussed in the rejection of claim 8, Rober et al. teach that electrically conductive additives may be added to polyamide and/or the polyvinylidene fluoride blend layers (col. 5, lines 1-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added carbon black to the fluoropolymer/copolymer blend of Witschard and Rober et al. in order to make the layer/s electrically conductive as taught by Rober et al.

In regard to claim 20, Lorek teaches that when the binder based on polymer A contains a fluorinated polymer, it is preferable that the fluorinated polymer present in the binder is the same

as that which is found in the adjacent layer of the fluorinated polymer (col. 4, lines 34-20). Therefore, one of ordinary skill in the art would have recognized to use the same fluoropolymer/copolymer blend in the flourinated layer of Lorek as is used in the fluorinated binder layers as taught by Lorek.

### *ANSWERS TO APPLICANT'S ARGUMENTS*

21. Applicant's arguments on page 8 of Paper 14 regarding the 35 U.S.C. 103 rejections repeated or initially made of record in Paper 10 are rendered moot due to the withdrawal of these rejections in this Office Action (Paper 15).

### *Conclusion*

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter B. Aughenbaugh whose telephone number is 703-305-4511. The examiner can normally be reached on Monday-Thursday from 9:00am to 6:00pm and on alternate Fridays from 9:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on 703-308-4251. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

wba WBA
10/28/03

HAROLD PYON
SUPERVISORY PATENT EXAMINER 10/31/03
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